इंटरनेट मानक

Disclosure to Promote the Right To Information

Whereas the Parliament of India has set out to provide a practical regime of right to information for citizens to secure access to information under the control of public authorities, in order to promote transparency and accountability in the working of every public authority, and whereas the attached publication of the Bureau of Indian Standards is of particular interest to the public, particularly disadvantaged communities and those engaged in the pursuit of education and knowledge, the attached public safety standard is made available to promote the timely dissemination of this information in an accurate manner to the public.

"जानने का अधिकार, जीने का अधिकार"
Mazdoor Kisan Shakti Sangathan
"The Right to Information, The Right to Live"

"पुराने को छोड नये के तरफ"
Jawaharlal Nehru
"Step Out From the Old to the New"

IS 13586 (1993): Definitions and nomenclature for carbon brushes, brush holders, commutators and slip rings for rotating electrical machinery [ETD 15: Rotating Machinery]

"ज्ञान से एक नये भारत का निर्माण"
Satyanarayan Gangaram Pitroda
"Invent a New India Using Knowledge"

Act Number 22 of 2005
The Indian Parliament
RIGHT TO INFORMATION

Made Available By
Public.Resource.Org

"ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है"
Bhartṛhari—Nītiśatakam
"Knowledge is such a treasure which cannot be stolen"

BLANK PAGE

BRUTUM FULMEN
IGNORANTIA JURIS NON EXCUSAT
PROTECTED BY COPYRIGHT

IS 13586 : 1993
[Superseding IS 3003 (Part 1) : 1977]
(Reaffirmed 2004)

भारतीय मानक

बिजली की घूर्णी मशीनरी के लिए कार्बन ब्रुश, ब्रुश-होल्डर, दिक्परिवर्तक तथा सर्पी-वलय की परिभाषाएँ और नामपद्धति

Indian Standard

DEFINITIONS AND NOMENCLATURE FOR CARBON BRUSHES, BRUSH-HOLDERS, COMMUTATORS AND SLIP-RINGS FOR ELECTRICAL MACHINERY

UDC 621·313·047·2/·5 : 001·4

© BIS 1993

BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

June 1993

Price Group 8

Rotating Machinery Sectional Committee, ET 15

FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Rotating Machinery Sectional Committee had been approved by the Electrotechnical Division Council.

The brushes are used in electric machines operating on dc, ac or ac/dc systems. The brush technology in the country is sufficiently developed and the brush manufacturers found the existing standards IS 3003 (*in parts*) lacking in clearly specifying the requirements of brush material and individual brushes fabricated out of blocks. In the new approach, it is decided to prepare the following standards out of existing parts of IS 3003.

a) Definitions and nomenclature of carbon brushes, brush holders, commutators and slip rings for electrical machinery [Doc : ET 15 (3100)], the present standard [Superseding IS 3003 (Part 1) : 1977];

b) Specification for brush material for electrical machinery [Doc : ET 15 (3101)] [Superseding IS 3003 (Part 2) : 1977]; and

c) Specification for brushes for electrical machinery [Doc : ET 15 (3102)] [Superseding IS 3003 (Parts 3 and 4) : 1978].

The aim of this standard is to provide definitions of various brush materials and nomenclature of different terms used in the carbon brush technology as applied to rotating electrical machinery.

This standard is aligned with IEC Pub 276 (1968) 'Definitions and nomenclature for carbon brushes, brush-holders, commutators and slip-rings', issued by the International Electrotechnical Commission (IEC).

Indian Standard

DEFINITIONS AND NOMENCLATURE FOR CARBON BRUSHES, BRUSH-HOLDERS, COMMUTATORS AND SLIP-RINGS FOR ELECTRICAL MACHINERY

1 SCOPE

1.1 This standard covers definitions and nomenclature of carbon brushes and brush holders for electrical machinery.

NOTE — For the present, it applies only to carbon brushes and brush holders for cylindrical commutators and slip-rings.

1.2 For guidance on selection of carbon brushes for particular applications, refer to IS 9919 : 1981 'Guide for selection and use of carbon brushes in electrical rotating machines'.

2 REFERENCES

The Indian Standards given below are necessary adjuncts to this standard:

IS No.	*Title*
9919 : 1981	Guide for selection and use of carbon brushes in electrical rotating machines
13466 : 1992	Specification for brushes for electrical machinery [superseding IS 3003 (Parts 3 and 4) : 1978]

3 TERMINOLOGY

3.0 For the purpose of this standard, the following definitions shall apply.

3.1 Brush

A conductor serving to maintain an electrical connection between stationary and moving parts of a machine or apparatus.

3.2 Brush Grades

According to the type of material used, brushes are classified in the following grades.

3.2.1 *Hard Carbon*

It consists of various forms of amorphous carbon.

3.2.2 *Carbon Graphite*

It consists of a mixture of amorphous carbon.

3.2.3 *Natural Graphite*

It consists principally of natural graphite.

3.2.4 *Electro-Graphite*

It consists of various forms of amorphous carbon converted during manufacture to artificial graphite.

3.2.5 *Metal Graphite*

It consists of a mixture of metals and graphite.

3.2.6 *Metal-Impregnated Graphite*

It consists of carbon or graphite which has been impregnated with molten metal under pressure.

3.2.7 *Resin-Bonded*

It consists of carbon or graphite bonded with synthetic resin.

NOTE — Further details may be obtained from IS 9919 : 1981.

3.3 Brush Dimensions

3.3.1 *Tangential Circumferential Dimension 't'*

Tangential (circumferential) dimension '*t*' is the distance between two parallel side surfaces *AEFB* and *CGHD* of the brush, as shown in Fig. 1.

3.3.2 *Axial Dimension 'a'*

Axial dimension '*a*' is the distance between two parallel side surfaces *BFGC* and *DHEA* of the brush, as shown in Fig. 1.

3.3.3 *Radial Distance 'r'*

Radial distance '*r*' is the distance between bottom surface *EFGH* and top surface *ABCD* of the brush, passing over the extremities of the brush elements, or parts of elements, which take part in the pressure application, as shown in Fig. 1.

NOTE — In case where it is difficult to apply the above definition of '*r*' agreement should be reached by discussion between the brush manufacturer and the user.

3.3.4 The dimensions shall always be stated in the following sequence:

$$t \times a \times r$$

A sign '×' should be placed between the letters.

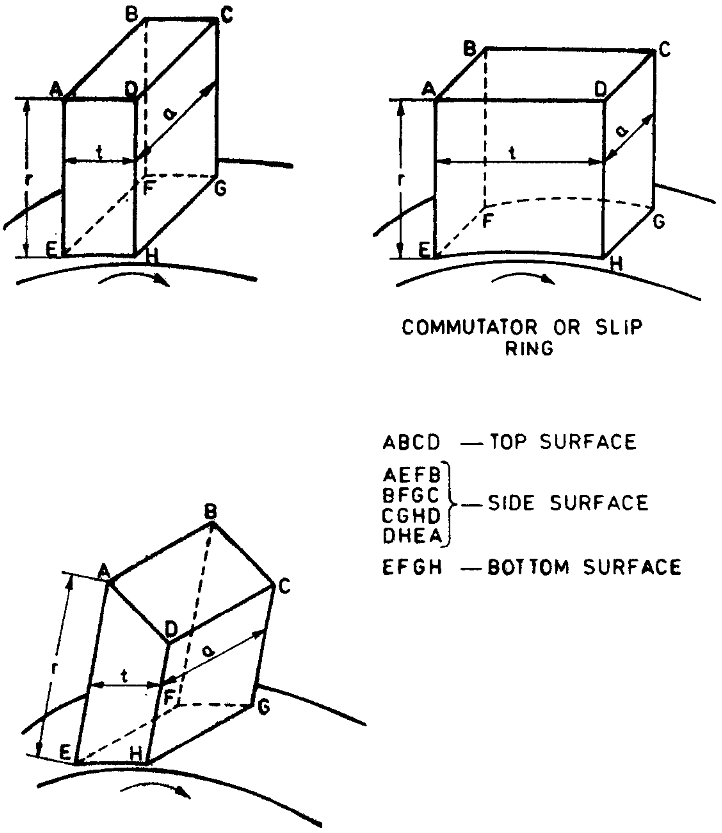
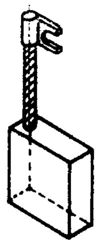
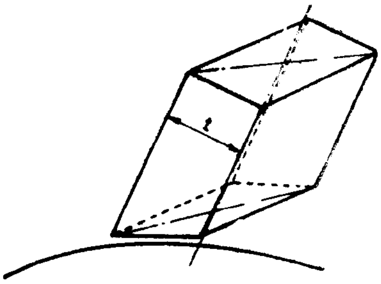
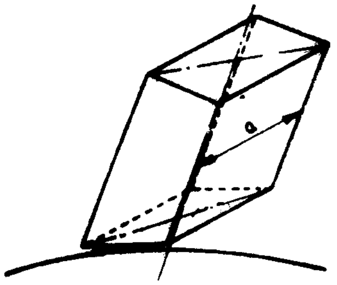
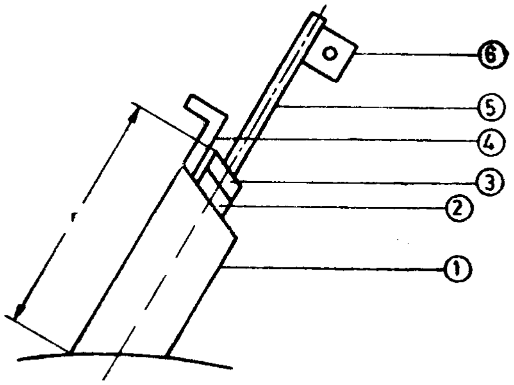
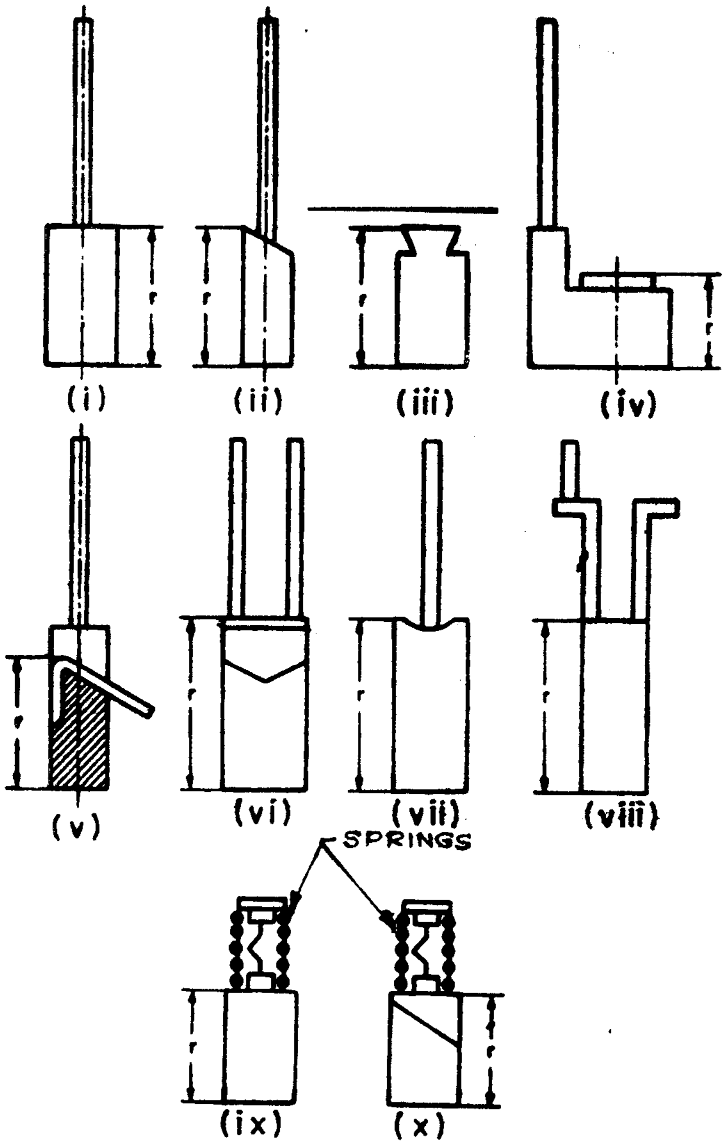


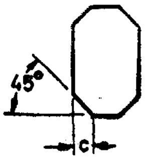
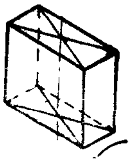
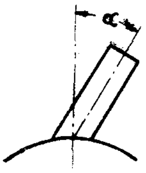
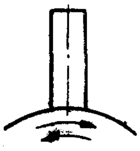
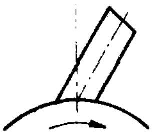
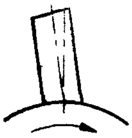
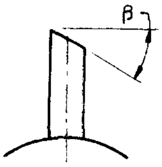
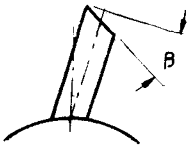
FIG. 1 SYMBOL FOR BRUSH DIMENSIONS

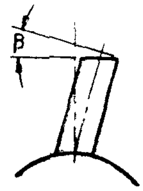
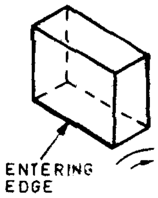
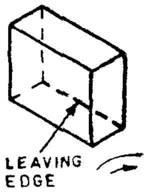
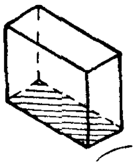
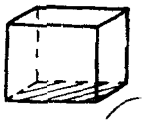
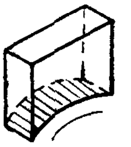
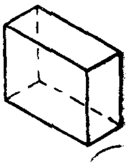
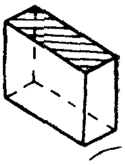
4 NOMENCLATURE

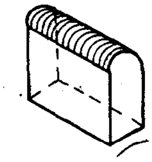
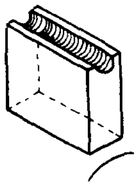
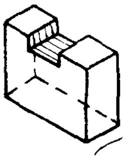
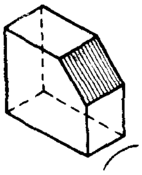
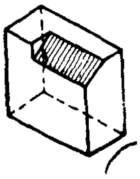
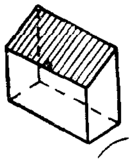
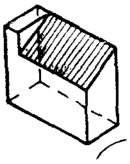
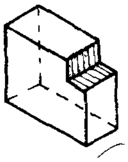
4.1 The terms used in brush technology are as follows:

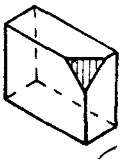
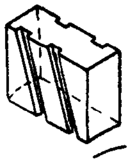
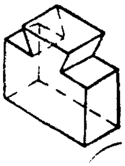
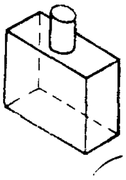
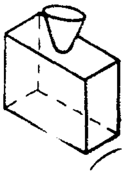
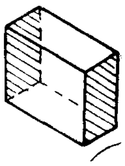
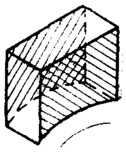
Sl No.	*Term*	*Diagram*
A. BRUSHES		
1	Brush	
2	Tangential dimension '*t*'	

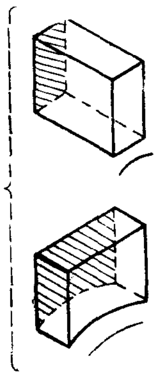
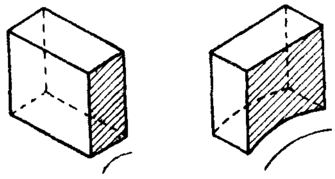
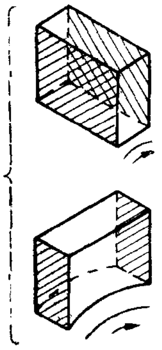
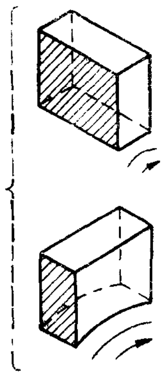
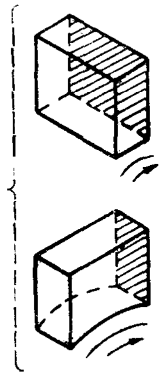
Sl No.	*Term*	*Diagram*
3	Axial dimension '*a*'	
4	Radial dimension '*r*' NOTE — Only the elements 1, 2, 3 take part in the pressure application.	
	Other examples: NOTE — The pressure systems fitted on brushes are excluded from '*r*'.	 (i) (ii) (iii) (iv) (v) (vi) (vii) (viii) (ix) (x)

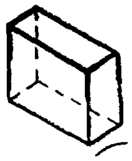
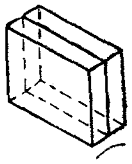
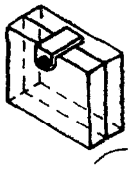
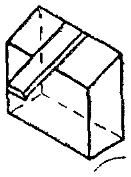
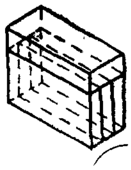
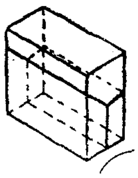
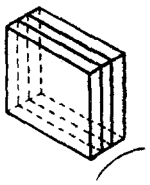
Sl No.	*Term*	*Diagram*
5	Chamfer	
6	Centre line	
7	Contact bevel angle	
8	Radial brush	
9	Reaction brush	
10	Trailing brush	
11	Top bevel angle	
12	Positive top bevel angle	

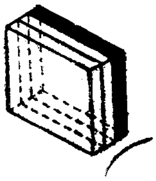
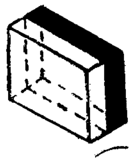
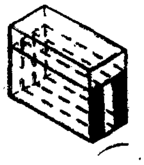
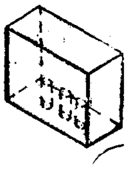
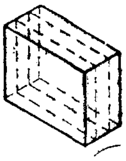
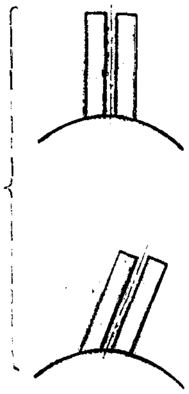
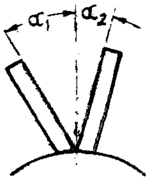
Sl No.	*Term*	*Diagram*
13	Negative top bevel angle	
14	Entering edge (leading edge)	
15	Leaving edge (trailing edge)	
16	Contact surface (contact face)	
17	Bevelled contact surface (bevelled contact face)	
18	Radiused contact surface (concave contact face)	
19	Top	
20	Top surface	

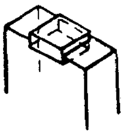
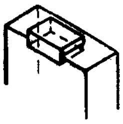
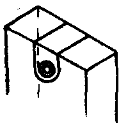
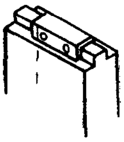
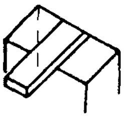
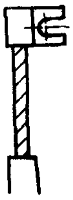
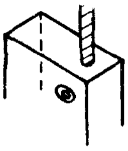
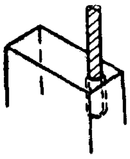
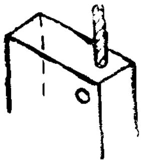
Sl No.	*Term*	*Diagram*
21	Rounded top (convex top)	
22	Grooved top	
23	Slotted top	
24	Chamfered top (bevelled edge)	
25	Partly chamfered top (partly bevelled edge)	
26	Bevelled top	
27	Partly bevelled top	
28	Shoulder	

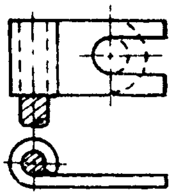
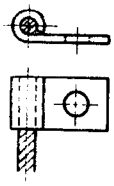
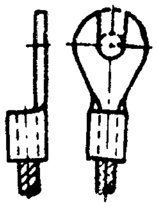
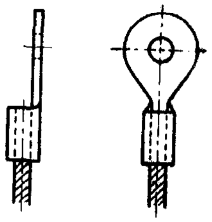
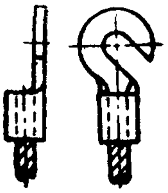
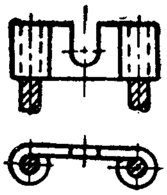
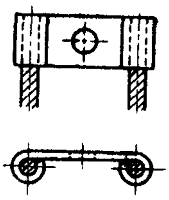
Sl No.	*Term*	*Diagram*
29	Bevelled corner	
30	Dust	
31	Headed brush	32 33 (*see* serial number 32, 33 and 34) 34
32	Dovetailed top (double angle shoulder)	
33	Cylindrical head	
34	Conical head	
35	Sides	 

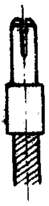
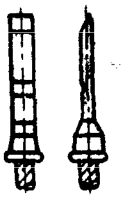
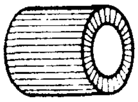
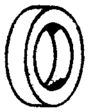
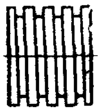
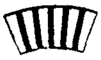
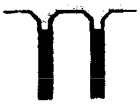
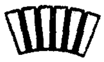
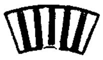
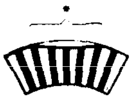
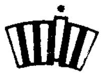
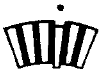
Sl No.	*Term*	*Diagram*
36	Inner side, that is, winding side	
37	Outer side, that is, non-winding side	
38	Faces	
39	Front face (Front)	
40	Back face (Back)	

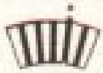
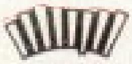
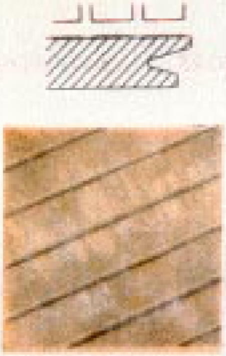
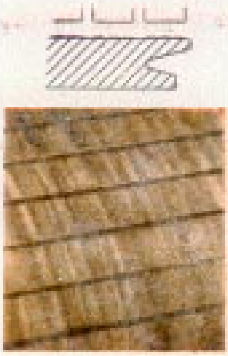
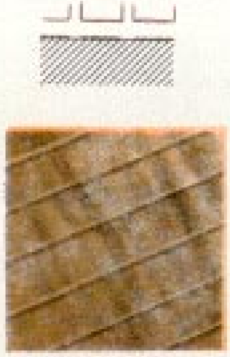
Sl No.	*Term*	*Diagram*
41	Solid brush	
42	Split brush	
43	Split brush with metal clip	
44	Brush with canti-lever top (or canti-lever brush)	
45	Triple split brush with separate top place	
56	Split brush with wedge top	 (*see* modified Fig.)
47	Sandwich brush (sandwich brush laminated)	
48	Dual grade brush	49 50 *see* serial number 49, 50 51 and 51

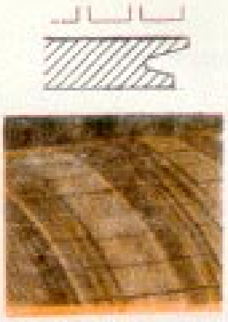
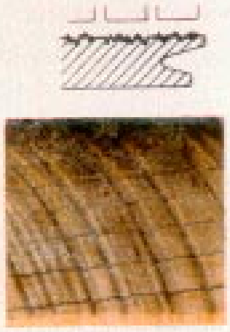
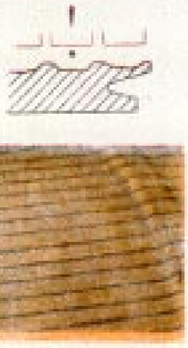
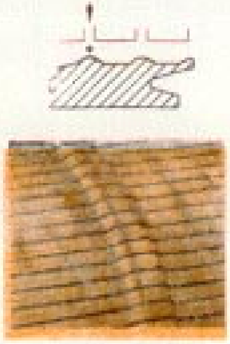
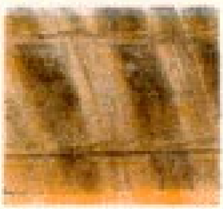
Sl No.	*Term*	*Diagram*
49	Dual grade sandwich (laminated)	
50	Dual grade split brush	
51	Dual grade triple split brush with separate top-piece	
52	Cored brush	
53	Metal guaze insert brush	
54	Tandem brush	
55	V-tandem brush	

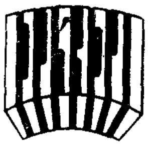
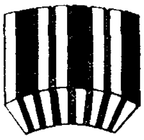
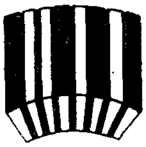
Sl No.	*Term*	*Diagram*
56	Top insert	
57	Insulated top	
58	Metal clip (*see* Fig. 3 of IS 13466 : 1992)	
59	Metal top	
60	Cantilever top	
B. FLEXIBLES (SHUNTS) AND CONNECTIONS		
61	Flexible (shunt)	
62	Insulated flexible	—
63	Tinned flexible or shunt	—
64	Riveted connection	
65	Tamped connection	
66	Soldered connection	

Sl No.	*Term*	*Diagram*
67	Flag terminal (open)	
68	Flag terminal (closed)	
69	Spade terminal (open)	
70	Spade terminal (closed)	
71	Hook terminal	
72	Double shoe terminal open	
73	Double shoe terminal closed	

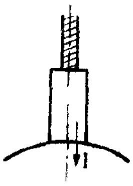
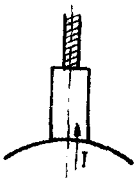
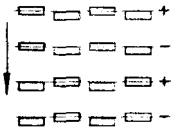
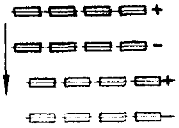
Sl No.	*Term*	*Diagram*
74	Pin terminal	
75	Flat pin terminal	
C. COMMUTATORS AND SLIP-RINGS		
76	Cylindrical commutator	
77	Slip-ring	
78	Helically grooved slip-ring	
79	Recessed or under-cut mica or insulation	
80	Chamfered bars	
81	Flush mica or insulation	
82	Worn down to the micas	
83	Flat (flat spot)	
84	High bar	
85	Low bar	

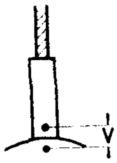
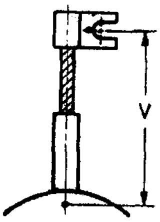
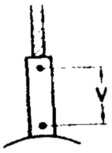
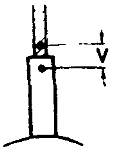
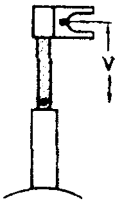
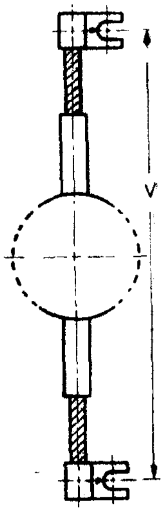
Sl No.	*Term*	*Diagram*
86	High or proud mica or insulation	
87	Rough commutator	
88	Skin (film)	
89	Lining (streaking)	
90	Banding	

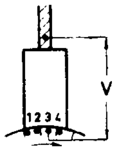
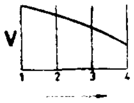
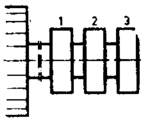
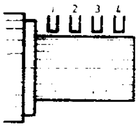
Sl No.	*Term*	*Diagram*
91	Ribbing	
92	Threading	
93	Grooving	
94	Ridging	
95	Copper dragging	

Sl No.	*Term*	*Diagram*
96	Burning	
97	Copper picking	—
98	Marking a) Regular bar marking	
	b) Irregular bar marking	

D. MISCELLANEOUS

Sl No.	*Term*	*Diagram*
99	Anodic brush	
100	Cathodic brush	
101	Circumferential stagger	
102	Axial stagger	

Sl No.	*Term*	*Diagram*
103	Brush contact drop	
104	Total single brush drop	
105	Internal brush drop	
106	Connection drop	
107	Flexible drop	
108	Total brush dropper brush pair	

Sl No.	*Term*	*Diagram*
109	Commutator/brush potential	
110	Brush potential curve	
111	Numbering of slip-rings NOTE — Numbering of slip-ring shall start from winding side.	
112	Numbering of brush tracks NOTE — Numbering of brush tracks shall start from winding side.	

Standard Mark

The use of the Standard Mark is governed by the provisions of the *Bureau of Indian Standards Act, 1986* and the Rules and Regulations made thereunder. The Standard Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well defined system of inspection, testing and quality control which is devised and supervised by BIS and operated by the producer. Standard marked products are also continuously checked by BIS for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

Bureau of Indian Standards

BIS is a statutory institution established under the *Bureau of Indian Standards Act, 1986* to promote harmonious development of the activities of standardization, marking and quality certification of goods and attending to connected matters in the country.

Copyright

BIS has the copyright of all its publications. No part of these publications may be reproduced in any form without the prior permission in writing of BIS. This does not preclude the free use, in the course of implementing the standard, of necessary details, such as symbols and sizes, type or grade designations. Enquiries relating to copyright be addressed to the Director (Publications), BIS.

Review of Indian Standards

Amendments are issued to standards as the need arises on the basis of comments. Standards are any reviewed periodically; a standard along with amendments is reaffirmed when such review indicates that no changes are needed; if the review indicates that changes are needed, it is taken up for revision. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition by referring to the latest issue of 'BIS Handbook' and 'Standards Monthly Additions'. Comments on this Indian Standard may be sent to BIS giving the following reference:

Doc : No. ETD 15 (3100)

Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

BUREAU OF INDIAN STANDARDS

Headquarters:

Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi 110002
Telephones : 331 01 31, 331 13 75

Telegrams : Manaksanstha
(Common to all offices)

Regional Offices :	Telephone
Central : Manak Bhavan, 9 Bahadur Shah Zafar Marg NEW DELHI 110002	331 01 31 331 13 75
Eastern : 1/14 C. I. T. Scheme VII M, V. I. P. Road, Maniktola CALCUTTA 700054	37 84 99, 37 85 61 37 86 26, 37 86 62
Northern : SCO 445-446, Sector 35-C, CHANDIGARH 160036	53 38 43, 53 16 40 53 23 84
Southern : C. I. T. Campus, IV Cross Road, MADRAS 600113	235 02 16, 235 04 42 235 15 19, 235 23 15
Western : Manakalaya, E9 MIDC, Marol, Andheri (East) BOMBAY 400093	632 92 95, 632 78 58 632 78 91, 632 78 92

Branches : AHMADABAD. BANGALORE. BHOPAL. BHUBANESHWAR. COIMBATORE. FARIDABAD. GHAZIABAD. GUWAHATI. HYDERABAD. JAIPUR. KANPUR. LUCKNOW. PATNA. THIRUVANANTHAPURAM.

Printed at New India Printing Press, Khurja, India